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L1: Entry 1 of 2

File: JPAB

Jun 18, 1996

PUB-NO: JP408156502A

DOCUMENT-IDENTIFIER: JP 08156502 A

TITLE: ENTIRE RUBBER WHEEL FOR TRAVELING ON PADDY FIELD

PUBN-DATE: June 18, 1996

## INVENTOR-INFORMATION:

NAME

COUNTRY

SHIMIZU, NOBUO

## ASSIGNEE-INFORMATION:

NAME

COUNTRY

BRIDGESTONE CORP

APPL-NO: JP06303998

APPL-DATE: December 7, 1994

INT-CL (IPC): B60 B 15/02

## ABSTRACT:

PURPOSE: To install a wheel without lateral distinction, and improve mud dropping property by setting the form of the section parallel to the equator of a lug axially extended and arranged at equal circumferential intervals on a thread part in such a manner as to be bisymmetric to the lug central line even in any axial section.

CONSTITUTION: A tire part 26 is integrally combined with a mounting part 21 formed of a mounting member 20 connected to a spoke 18A outside forming a disc part 18, and a lug 34 is laterally alternately arranged on a thread part 26A at equal circumferential intervals to be vertically extended from the equator to the outside of the wheel shaft direction. In the lug 34, its sectional form cut in a plane parallel to the equator 31 is set so as to be a mountain form in which bisymmetric side wall inclined surfaces are recessed to the central line of the lug 34 even in any section on the wheel axial direction. Since the circumferential section of the lug 34 is thus longitudinally symmetric in the rotating direction, the tire can be installed for both right and left uses, the spoke type disc part 18 makes it difficult to adhere mud to an entire rubber tire mounting part 21, and traction performance can be kept without having a careless mud dropping.

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L1: Entry 2 of 2

File: DWPI

Jun 18, 1996

DERWENT-ACC-NO: 1996-338292

DERWENT-WEEK: 199634

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TITLE: Rubber wheel for rice transplanting machine used in rice field - has several lags, formed on periphery of tyre, whose individual cross-sectional forms are symmetric compared with parallel lag central lines

PATENT-ASSIGNEE:

ASSIGNEE

CODE

BRIDGESTONE CORP

BRID

PRIORITY-DATA: 1994JP-0303998 (December 7, 1994)

[Search Selected](#)[Search ALL](#)[Clear](#)

PATENT-FAMILY:

PUB-NO

PUB-DATE

LANGUAGE

PAGES

MAIN-IPC

☐ [JP 08156502 A](#)

June 18, 1996

007

B60B015/02

APPLICATION-DATA:

PUB-NO

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JP 08156502A

December 7, 1994

1994JP-0303998

INT-CL (IPC): [B60](#) [B](#) [15/02](#)

ABSTRACTED-PUB-NO: JP 08156502A

BASIC-ABSTRACT:

The wheel has a tyre attaching portion integrally combined to a rubber tyre (26) which has a treading section. Several lags, which extend to the axial direction, are set at substantially equal intervals in periphery of the tyre.

In any cross-section along the tyre axial direction, the cross-sectional form of the lag, is substantially symmetric compared with the central line of the lag. The individual cross-sectional forms of the lags are formed parallel with each other w.r.t. a wheel center line.

ADVANTAGE - Does not partition left and right sections of wheel, and has superb mud-dropping characteristic.

CHOSEN-DRAWING: Dwg.1/11

TITLE-TERMS: RUBBER WHEEL RICE TRANSPLANT MACHINE RICE FIELD LAG FORMING PERIPHERAL

TYRE INDIVIDUAL CROSS SECTION FORM SYMMETRICAL COMPARE PARALLEL LAG CENTRAL LINE

DERWENT-CLASS: Q11

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N1996-285006

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技術表示箇所

審査請求 未請求 請求項の数 5 O L (全 7 頁)

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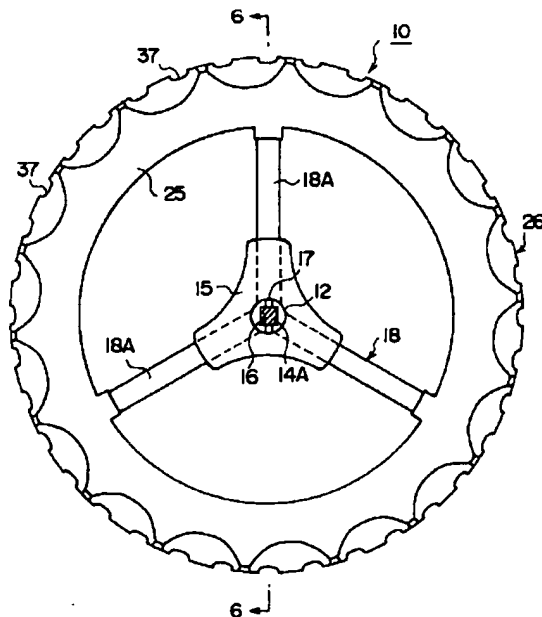
ァミリア316号

(54) 【発明の名称】 水田走行用総ゴム車輪

(57) 【要約】

【目的】 左右の区分が無く1種類で良く、泥落とし性に優れたスポークタイプの水田走行用総ゴム車輪を得る。

【構成】 ディスクの取付部に総ゴムタイヤを一体的に組み合わせてなる水田走行用総ゴム車輪、特に田植機への装着に方向性を有する車輪であって、ディスク18をスポークタイプ18Aとし、前記タイヤ26のトレッド踏面部に軸方向に延びる周方向に略等間隔に配設された多数のラグ34を配し、該ラグの赤道31に平行な面で切った断面形状がタイヤ軸方向上のどの断面においてもラグ34の中心線に対して略左右対称であることを特徴とする。トレッド踏面部のラグの周方向断面が回転方向に前後対称であるため、左右の区分が無く1種類で良く、左右の車輪は裏返すことによって共用することができ、またディスク部がスポークタイプであるため泥はスポーク間の空間により総ゴムタイヤの取付部に泥が付着し難く、泥落とし性を向上させる。



## 【特許請求の範囲】

【請求項1】 車軸への取付用ボスと、該取付用ボスに接合されて半径方向外側に延びる複数のスポークと、該スポークの半径方向外側に設けられたタイヤ取付部と、を有し、前記取付部に総ゴムタイヤを一体的に組み合わせてなる水田走行用総ゴム車輪であって、前記タイヤのトレッド踏面部に軸方向に延びる周方向に略等間隔に配設された多数のラグを有し、前記ラグは赤道に平行な面で切った断面形状がタイヤ軸方向上のどの断面においてもラグの中心線に対して略左右対称であることを特徴とする水田走行用総ゴム車輪。

【請求項2】 前記総ゴムタイヤがその内径側にタイヤ軸心を含む面で切った断面形状において先端部が略鋭角な突出部が設けられていることを特徴とする請求項1に記載の水田走行用総ゴム車輪。

【請求項3】 前記ラグの赤道側の内端部が、タイヤ周方向に延びるリブにつながることを特徴とする請求項1に記載の水田走行用総ゴム車輪。

【請求項4】 前記ラグの周方向幅がタイヤ軸方向外側に向かうにしたがい漸減することを特徴とする請求項1に記載の水田走行用総ゴム車輪。

【請求項5】 前記ラグの周方向断面においてラグの側壁傾斜面のタイヤ軸心を含む面に対する傾斜角度がタイヤ軸方向外側に向かうにしたがい漸減することを特徴とする請求項1に記載の水田走行用総ゴム車輪。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は車輪ディスク部の取付部に総ゴムタイヤを一体的に組み合わせ水田走行用総ゴム車輪において、車軸への装着に方向性を持つタイプに対応した水田走行用総ゴム車輪に関する。

## 【0002】

【従来の技術】従来の水田走行用総ゴム車輪は、泥はけ性およびトラクション性を得るために図10および図11に示される如く、総ゴムタイヤのトレッド踏面部70にラグ72をハの字状に、赤道74を挟んで左右交互に配設している。走行時にラグ72はハの字の先端部aがまず接地し、次いで後方部bが接地するように設計されており、これがためにラグ72が泥を側方に排出しながら走行でき泥詰まりを来すことなくトラクション性を維持することができる。このため車輪は使用時の回転方向に対してタイヤのトレッド踏面部70において方向性を持っている。

【0003】総ゴム車輪の機体への着脱は、車輪のボス部を機体の車軸に外側から内側に向かって挿し込み装着される。車輪の回転を車輪に伝えるには、多角断面形状を利用して伝える方法、キーを挿入して伝える方法等があり、車輪の軸方向の動きを規制するには、車軸先端でビス止めする方法、車軸および車輪のボスに貫通孔を設けボルトおよびナットで止める方法等がある。いずれに

しても、車軸に対する車輪のボス部の挿入方向が決まっており、車輪は車軸への装着に際しても方向性を持っている。

【0004】従って、右用の水田走行用総ゴム車輪を左用に反転して装着した場合、トレッド踏面部は上述のように方向性を持って製造、準備されているため、トレッド踏面部のラグの配列が車輪の使用回転方向に対して逆の配列関係、すなわちハの字の後端部部bがまず接地し、次いで先端部aが接地することになり、ラグの泥はけ性およびトラクション向上の機能が得られない。そのため左右に共用して使用することができない。

【0005】このようにトレッド踏面部が回転方向に対して方向性を持つ総ゴムタイヤが、機体への装着に方向性を有する車輪のディスク部に一体的に組み合わせた水田走行用総ゴム車輪においては、左右の車輪に互換性が無く、別々に準備する必要があるため、左右一組の車輪を製造する必要がある、設備投資および車輪の保管スペースの負担が増大するという不具合があった。また、水田走行用に左右を間違えて装着する恐れもある。

【0006】車輪のディスク部において、ディスク部が連続延板からなる円盤状のものであると堅牢性等で優れるが、総ゴムタイヤの取付円盤部分に泥が付着し大きな塊となって溜り易く、車輪の回転に伴い持ち上げられ、望まない場所で不用意に泥を落とし耕作、移植作業上の害をなすという問題を有する。

## 【0007】

【発明が解決しようとする課題】本発明は上記事実を考慮し、左右の区分が無く種類でよい、しかも総ゴムタイヤの取付部への泥溜りによる不用意な泥落としのない泥落とし性に優れた水田走行用総ゴム車輪を得ることが目的である。

## 【0008】

【課題を解決するための手段】上記目的を達成するために請求項1に記載の発明は、車軸への取付用ボスと、該取付用ボスに接合されて半径方向外側に延びる複数のスポークと、該スポークの半径方向外側に設けられたタイヤ取付部と、を有し、前記取付部に総ゴムタイヤを一体的に組み合わせてなる水田走行用総ゴム車輪であって、前記タイヤのトレッド踏面部に軸方向に延びる周方向に略等間隔に配設された多数のラグを有し、前記ラグは赤道に平行な面で切った断面形状がタイヤ軸方向上のどの断面においてもラグの中心線に対して略左右対称であることを特徴としている。

【0009】請求項2に記載の発明は、前記総ゴムタイヤがその内径側にタイヤ軸心を含む面で切った断面形状において先端部が略鋭角な突出部が設けられていることを特徴としている。

【0010】請求項3の発明は、前記ラグの赤道側の内端部が、タイヤ周方向に延びるリブにつながることを特徴としている。

【0011】請求項4の発明は、前記ラグの周方向幅がタイヤ軸方向外側に向かうにしたがい漸減することを特徴としている。

【0012】請求項5の発明は、前記ラグの周方向断面においてラグの側壁傾斜面のタイヤ軸心を含む面に対する傾斜角度がタイヤ軸方向外側に向かうにしたがい漸減することを特徴としている。

【0013】

【作用】請求項1に記載の本発明の水田走行用総ゴム車輪では、トレッド踏面部のラグの周方向断面が回転方向に前後対称であるため、車輪は裏返すことによって左右共用とすることができる。そしてディスク部がスポークタイプであるためスポーク間の空間により総ゴムタイヤの取付部に泥が付着し難く、走行に際して泥が持ち上げられることがないので、不用意な泥落としが発生することなく、また踏面部に泥詰まりし難いのでトラクション性を維持できる。

【0014】請求項2に記載の本発明の水田走行用総ゴム車輪では、総ゴムタイヤの内径側に先端部が略鋭角な突出部が設けられているため泥切れ性が良く、泥が容易に落ち、車輪の回転によっても泥が持ち上げられることが無く、不用意な泥落としの憂いを解消する。

【0015】請求項3に記載の本発明の水田走行用総ゴム車輪では、ラグの赤道側端部が、タイヤ周方向に延びるリブにつながるため、耐横滑り性に効果があり、特に前輪においては良好な直進性を得ることができる。

【0016】請求項4に記載の本発明の水田走行用総ゴム車輪では、車輪の回転によりラグが土壌内に踏み込むと泥がラグの間に入ることでこの泥を側方に排出する必要があるが、ラグのトレッド踏面部の周方向幅をタイヤ軸方向外側に向かうにしたがい漸減しているため、ラグ間で囲まれた溝部が赤道側より軸方向外側に向かうにしたがい広くなり、その結果、側方への排土が円滑に行なわれ、溝部に泥が詰まり難く、トラクション性が向上する。

【0017】請求項5に記載の本発明の水田走行用総ゴム車輪では、ラグの周方向断面においてラグの側壁傾斜面のタイヤ軸心を含む面に対する傾斜角度がタイヤ軸方向外側に向かうにしたがい漸減するため、ラグ間溝底部での広さが赤道からタイヤ軸方向外側に向かうにしたがい広くなり、その結果、排土が円滑に行なわれ、溝部に泥が詰まり難く、トラクション性が向上する。

【0018】

【実施例】本発明の水田走行用総ゴム車輪の一実施例を図1～図7に従って説明する。

【0019】図4乃至図7に示される如く、水田走行用総ゴム車輪10の軸心部には、取付用ボス12が配設されている。この取付用ボス12は円管状とされており、田植機14の車軸14Aに装着されている。この車軸14Aは4角軸(図4)もしくは丸軸(図5)に形成され

ており、取付用ボス12の嵌合孔16は、車軸14Aに外嵌している。車軸14Aが丸軸の場合、図5に示すようにキー16Aを挿入して、車軸14Aの回転を車輪に伝えるようにしている。

【0020】また、図4に示される如く、取付用ボスにはネジが切られた取付穴17が設けられており、車輪装着姿勢でこの取付穴17にビス等(図示せず)がねじ込まれて固定されて車輪の軸方向への動きが止められている。車輪の赤道31に対して取付用ボス12は田植機14の外側にやや突出して接合されており、該ボスの田植機の外側部分には車軸の先端部に設けられた上記貫通孔14に対応した貫通孔が設けられる。このように車輪は車軸へ装着するに際して方向性を持っている。

【0021】水田走行用総ゴム車輪10の取付用ボス12の外周部に3本のスポーク18Aが接合されている。この3本のスポーク18Aは半径方向外側に延び車輪のディスク部18を形成している。スポーク18Aの半径方向外側部は環状の取付部材20に接合されており、タイヤの車輪における取付部21を形成しており、タイヤはこの取付部21に一体的に組合わされる。

【0022】このようにタイヤ取付部21を介してタイヤ部26が車輪に一体的に組合わされている。なお、タイヤ部26は総ゴムタイヤとされている。また、上記取付部材20およびスポーク18Aは、鉄、アルミニウム等の金属製のパイプを加工したものが使用されている。

【0023】また、ディスク部18の半径方向内側部には、補助板15が配設されている。この補助板15はスポーク18Aに溶接により接合されており、ディスク18を補強している。

【0024】図1に示される如く、タイヤ部26のトレッド踏面部26Aには、ラグ34が赤道31付近から赤道31に対し垂直に車輪軸方向外側へ延び、左右互い違いに周方向等間隔に配設されている。また、ラグ34の赤道側の内端部34Aには赤道31上を車輪周方向に延びるリブ36につながっており、赤道31に対して同じ側の隣合うラグ34とラグ34で囲まれた部位は溝部38となっている。なお、リブ36は赤道上になくともよく、赤道から左右どちらかに若干片寄って配列させるようにしてもよい。

【0025】図2および図3に示される如く、ラグ34は赤道31に平行な面で切った断面形状が車輪軸方向上のどの断面においてもラグの中心線に対して左右対称の側壁傾斜面35が凹曲した山形となっている。なお、ラグ34の頂部34Bの車輪周方向幅Lはリブ36と略同じ一定幅とされている。

【0026】また、ラグ34の周方向断面においてラグ34の側壁傾斜面35の頂部側端部34Cの車輪軸心を含む面Hに対する傾斜角度 $\alpha 1$ 、 $\alpha 2$ が車輪軸方向外側に向かうにしたがって漸減している( $\alpha 1 < \alpha 2$ )。

【0027】本実施例の水田走行用総ゴム車輪10では、タイヤ部26のトレッド踏面部26Aのラグパターンが、赤道31上の左右ラグ間の距離の中心点P（図1参照）に対して点对称であり、かつ、ラグ34のタイヤ周方向断面が、図2および図3に示される如く、回転方向に前後対象である。このため、左右の車輪は裏返すことによって共用することができるので、左右の車輪を別々に準備する必要がないため、設備投資および車輪の保管スペースの負担が軽減されると共に、水田走行用に左右を間違えて装着する恐れも無くなる。

【0028】本実施例では、このようにディスク部をスポークタイプとすることにより泥詰まり性を改善し、タイヤ部の当面に赤道付近から赤道に対して垂直に車輪軸方向外側へ延び左右互い違いに周方向略等間隔に配設された多数のラグを有し、ラグは赤道に平行に切った断面形状が車輪軸方向上のどの断面においてもラグの中心線に対して略左右対称とした構成にしたため、左右の区分がなく1種類で良いという優れた利点を有する。

【0029】図7に示される如く、総ゴムタイヤ26の内径側がタイヤ軸心を含む面で切った断面形状において略鋭角な突出部25により形成されている。本実施例の車輪は、タイヤ部の内径側に平滑な泥落とし面25Aおよび25Bを有し、これにより先端角度 $\theta$ が90度の突出部25が形成されている。この突出部によりスポーク間の空間部と相まって泥切れ性に優れ泥が容易に落とすことができる。突出部25の先端角度 $\theta$ は、50度～100度が好ましく、60度～90度がさらに好ましい。50度未満では総ゴムタイヤの内径側に延びる断面高さが高くなり泥落とし性の効果が小さくなり、100度を越えると泥が乗り易く泥落とし性が不十分なものとなる。

【0030】本実施例の水田走行用総ゴム車輪10では、ラグ34の赤道側端部34Aが、車輪周方向に延びるリブ36につながっているため、耐横滑り性を向上させ、特に前輪では良好な直進性を得ることができる。

【0031】本実施例の水田走行用総ゴム車輪10では、ラグ34の周方向断面において、ラグ34の側壁傾斜面35の踏面側端部34Cの車輪軸心を含む面Hに対する傾斜角度 $\alpha_1$ 、 $\alpha_2$ が赤道から軸方向外側に向かう

にしたがい漸減している（ $\alpha_1 < \alpha_2$ ）ため、溝部38の底部での広さが赤道31から車輪軸方向外側に向かうにしたがって広くなり、その結果、排土が円滑に行なわれ、溝部に泥が詰まり難く、トラクション性が向上する。

【0032】上記の実施例では、ラグ34の傾斜面35が凹曲した山形とし、ラグ34の頂部34Aの車輪周方向幅Lを一定幅としたが、これに代えて、図8および図9に示される如く、ラグ34の傾斜面35を直線としてもよく、また、ラグ34の頂部34Bの車輪周方向幅L1、L2を赤道側から車輪軸方向外側に向かうにしたがって漸減した（ $L_1 < L_2$ ）構成としてもよい。

【0033】この場合には、車輪の回転により、ラグ34が土に踏み込むと、泥がラグ34の間に入り、赤道31側より外に向かって押し出されるが、ラグ34の頂部34Bの車輪周方向幅L1、L2が軸方向外側に向かうにしたがって漸減している（ $L_1 < L_2$ ）ため、赤道31に対して同じ側の隣り合うラグ34とラグ34で囲まれた溝部38が、赤道31側より外に向かうにしたがって広くなり、その結果、トレッド踏面部28の側方から排土し易くなり、泥詰まりし難く、トラクション性が向上する。

【0034】なお、図1および図6に示されている符合37（図4および図5参照）は、リブ36に設けられた切欠き段差部であり、リブ36の外周はブロック化しており、異物乗り越え時の補助とすることができる。

【0035】〔試験例〕本発明の効果を確認するために本発明品の水田走行用総ゴム車輪（発明品1、2）と、従来の水田走行用空気入りタイヤ車輪（従来品1）およびディスク部が円盤状である水田走行用総ゴム車輪（比較品1）と、を表1の使用で製造し、それぞれに泥落とし試験を行ないその結果を表1に示す。

【0036】なお、泥落とし試験は代掻き後5日経った水田にて実施し、耕盤までの深さは150mm～200mmで、土質はやや粘度分が多くくっつき易い状態で行なった。

【0037】

【表1】

	従来品 1	比較品 1	発明品 1	発明品 2
タイヤ	空気入り	総ゴム	総ゴム	総ゴム
ディスク部	3本スポーク	円盤	3本スポーク	3本スポーク
外径 (mm)	600	600	600	600
タイヤ幅 (mm)	60	60	60	60
ラグパターン	方向性有り	方向性有り	方向性無し	方向性無し
ラグ断面	非対称	非対称	対称	対称
ラグ幅	一定	一定	一定 (図1)	外細い (図8)
ラグ角度	一定	一定	外小 (図2、3)	一定 (図9)
必要タイヤ種	1種	2種	1種	1種
泥落とし性	やや良くない	良くない	良い	良い

【0038】表1の結果から本発明品の水田走行用総ゴム車輪(発明品、1、2)が、必要タイヤ種が1種類で良く、且つ泥落とし性が空気入りタイヤより良好であり、円盤状のディスクより優れることが明らかである。

【0039】請求項1に記載の水田走行用総ゴム車輪は、トレッド踏面部のラグの周方向断面が回転方向に前後対称であるため、左右の車輪は裏返すことによって共用することができ、左右の区分がなく1種類で良いという経済性に優れ、また、ディスク部がスポークタイプであるためスポーク間の空間により総ゴムタイヤ取付部に泥が付着し難いため、泥落とし性を向上させ、また、トラクション性を向上させる効果を有する。

【0040】請求項2に記載の本発明の水田走行用総ゴム車輪は、請求項1記載の水田走行用総ゴム車輪において、タイヤ部の内径側が略鋭角な突端部で構成されているのでスポーク間の空間部と相まって泥切れ性に優れ泥落とし性を向上させる効果を有する。

【0041】請求項3に記載の本発明の水田走行用総ゴム車輪は、請求項1記載の水田走行用総ゴム車輪において、ラグの赤道側端部が、タイヤ周方向に延びるリブにつながる構成としたので、上記効果に加えて、耐横滑りし難く、良好な直進性が得られるという優れた効果を有する。

【0042】請求項4に記載の本発明の水田走行用総ゴム車輪は、請求項1記載の水田走行用総ゴム車輪において、車輪の回転によりラグが土に踏み込むと泥がラグの間に入るのでこの泥を排出する必要があるが、ラグのトレッド踏面部の周方向幅をタイヤ軸方向外側に向かうにしたがい漸減す構成としているので、ラグ間で囲まれた溝部が赤道側より軸方向外側に向かうにしたがい広くなり、その結果、排土が円滑に行なわれ、ラグ間に泥が詰まり難く、トラクション性が向上するという効果を有する。

【0043】請求項5に記載の本発明の水田走行用総ゴム車輪では、請求項1記載の水田走行用総ゴム車輪において、ラグの周方向断面においてラグの側壁傾斜面のタイヤ軸心を含む面に対する傾斜角度がタイヤ軸方向外側\*

に向かうにしたがい漸減する構成としているので、ラグ間溝底部での広さが赤道からタイヤ軸方向外側に向かうにしたがい広くなり、その結果、排土が円滑に行なわれ、溝部に土が詰まり難く、トラクション性が向上するという効果を有する。

#### 【図面の簡単な説明】

【図1】本発明の一実施例の水田走行用総ゴム車輪のトレッドパターンを示す平面図である。

【図2】図1の2-2線断面図である。

【図3】図1の3-3線断面図である。

【図4】本発明の一実施例の水田走行用総ゴム車輪の車両装着状態を示す車輪周方向に平行な面で切断した断面図である。

【図5】本発明の他の実施例の水田走行用総ゴム車輪の車両装着状態を示す車輪周方向に平行な面で切断した断面図である。

【図6】図4の5-5線断面図である。

【図7】図6の一部拡大断面図である。

【図8】本発明の他の実施例の水田走行用総ゴム車輪のトレッドパターンを示す平面図である。

【図9】図8の9-9線断面図である。

【図10】従来例の水田走行用総ゴム車輪のトレッドパターンを示す平面図である。

【図11】図10の11-11線断面図である。

#### 【符号の説明】

- 10 水田走行用車輪
- 12 取付用ボス
- 14 田植機
- 14A 車軸
- 18 ディスク部
- 18A スポーク
- 20 タイヤ取付部材
- 21 タイヤ取付部
- 26 タイヤ(部)
- 28 トレッド踏面部
- 31 赤道
- 34 ラグ

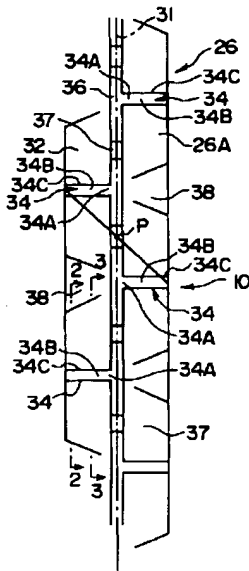


34B ラグ頂部

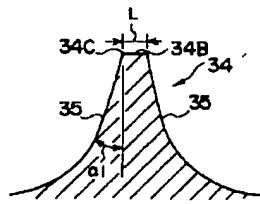
36 リブ

38 溝部

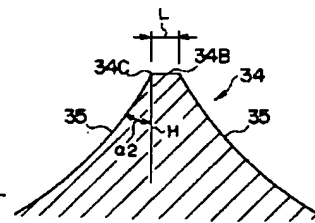
【図1】



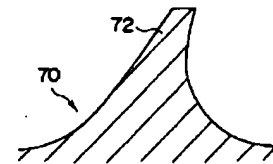
【図2】



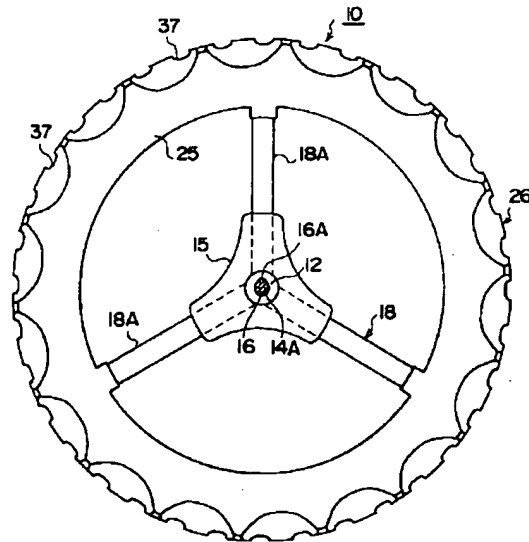
【図3】



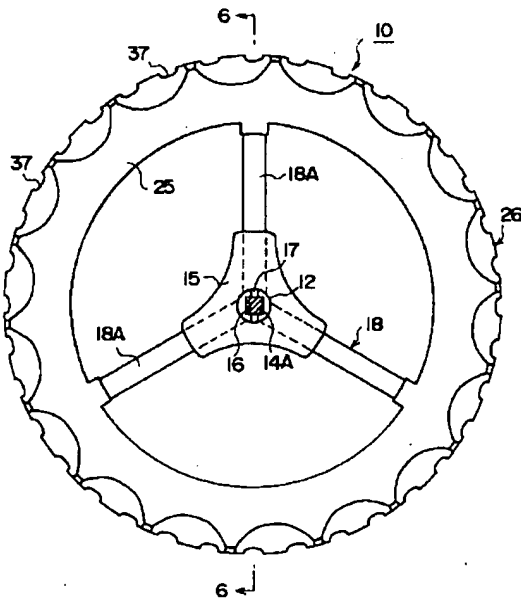
【図11】



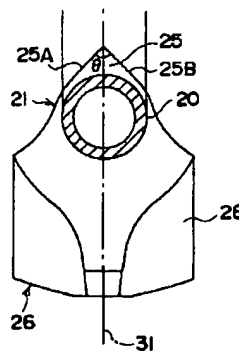
【図5】



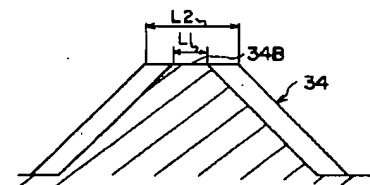
【図4】



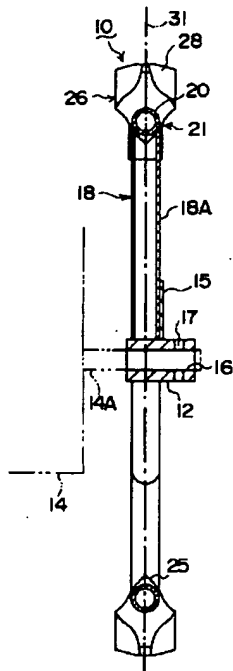
【図7】



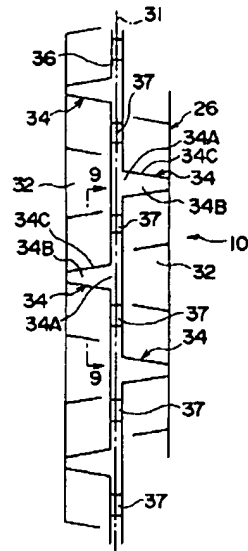
【図9】



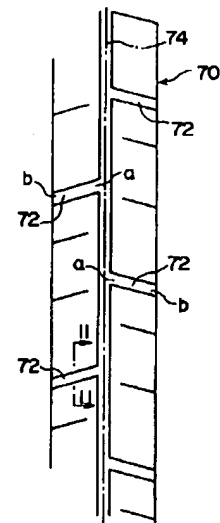
【図6】



【図8】



【図10】



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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the total rubber wheel for paddy field transit corresponding to the type which combines the total rubber tire with the attachment section of the wheel disk section in one, and has directivity in wearing to an axle in the total rubber wheel for paddy field transit.

[0002]

[Description of the Prior Art] In order to obtain mud brush nature and traction nature, as shown in drawing 10 and drawing 11 R> 1, a lug 72 is faced into the tread tread section 70 of the total rubber tire, and the conventional total rubber wheel for paddy field transit faces across the equator 74 in the shape of [ of Ha ] a character, and is arranging it alternately with right and left. It is designed so that the point a of Ha's handwriting may ground a lug 72 first and the back section b may subsequently ground at the time of transit, and traction nature can be maintained, without this being able to run, while a lug 72 discharges mud in the side to accumulate, and causing mud plugging. For this reason, the wheel has directivity in the tread tread section 70 of a tire to the direction of a rotation time at the time of use.

[0003] The attachment and detachment to the airframe of the total rubber wheel put the boss section of a wheel in the axle of an airframe toward the inside from an outside, and lump wearing is carried out. In order for there to be an approach of telling using a multiple cross-section configuration in order to tell rotation of an axle to a wheel, the approach of inserting and telling a key, etc. and to regulate a motion of the shaft orientations of a wheel, there is the approach of preparing the boss of the approach of carrying out a bis-stop at the axle tip, an axle, and a wheel a through tube, and stopping with a bolt and a nut etc. Anyway, the path of insertion of the boss section of a wheel to an axle was decided, and even if it faces a wheel wearing to an axle, it has directivity.

[0004] Therefore, since the tread tread section has directivity as mentioned above and is manufactured and prepared, when left is reversed and equipped with the total rubber wheel for paddy field transit for right, The back edge section b of the character of reverse array relation, i.e., Ha, will ground [ the array of the lug of the tread tread section ] first to the use hand of cut of a wheel, subsequently Point a will ground, and the function of the mud brush nature of a lug and the improvement in a traction is not obtained. Therefore, it cannot be used in common and used for right and left.

[0005] Thus, in the total rubber wheel for paddy field transit which the total rubber tire in which the tread tread section has directivity to a hand of cut combined with the disk section of a wheel which has directivity in wearing on an airframe in one, since there was no compatibility in a wheel on either side and it was necessary to prepare separately, the wheel of a right-and-left lot needed to be manufactured and there was fault that plant-and-equipment investment and the burden of the storage space of a wheel increased. Moreover, there is also a possibility of mistaking and equipping paddy field transit vehicles with right and left.

[0006] Although it excels in robustness etc. that it is the disc-like thing which the disk section becomes from a plate a continuation total in the disk section of a wheel, mud adheres to the attachment disk part

of the total rubber tire, and it becomes a big lump, and it is easy to collect, and is raised with rotation of a wheel, and mud is carelessly dropped to the location which is not desired and it has the problem of making the damage on cultivation and transplantation.

[0007]

[Problem(s) to be Solved by the Invention] It is the purpose to obtain the total rubber wheel for paddy field transit excellent in the doormat nature which this invention does not have a partition on either side in consideration of the above-mentioned fact, and does not have a good unprepared doormat moreover according to \*\*\*\* to the attachment section of the total rubber tire at one kind.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose invention according to claim 1 The boss for attachment to an axle, and two or more spokes which are joined by this boss for attachment and prolonged on the radial outside, It is the total rubber wheel for paddy field transit which has the tire attachment section prepared in the radial outside of this spoke, and comes to combine the total rubber tire with said attachment section in one. It has the lug of a large number arranged in the hoop direction which extends in shaft orientations at the tread tread section of said tire by abbreviation regular intervals, and the cross-section configuration cut in the field where said lug is parallel to the equator is characterized by being abbreviation bilateral symmetry to the center line of a lug in every cross section on tire shaft orientations.

[0009] the cross-section configuration where invention according to claim 2 was cut in the field where said total rubber tire contains a tire axial center in the bore side -- setting -- a point -- abbreviation -- it is characterized by preparing the acute angle lobe.

[0010] Invention of claim 3 is characterized by connecting the toe by the side of the equator of said lug with the rib prolonged in a tire hoop direction.

[0011] Invention of claim 4 is characterized by gradually decreasing as the hoop direction width of face of said lug goes to a tire shaft-orientations outside.

[0012] Invention of claim 5 is characterized by gradually decreasing as whenever [ to the field which contains the tire axial center of the side-attachment-wall inclined plane of a lug in the hoop direction cross section of said lug / tilt-angle ] goes to a tire shaft-orientations outside.

[0013]

[Function] With the total rubber wheel for paddy field transit of this invention according to claim 1, since the hoop direction cross section of the lug of the tread tread section is symmetrical with order to a hand of cut, a wheel can be considered as right-and-left common use by turning over. And without generating an unprepared doormat, since the disk section is a spoke type, mud cannot adhere to the attachment section of the total rubber tire easily due to the space between spokes and mud is not lifted on the occasion of transit, since it is hard to carry out mud plugging to the tread section, traction nature can be maintained.

[0014] the total rubber wheel for paddy field transit of this invention according to claim 2 -- the bore side of the total rubber tire -- a point -- abbreviation -- since the acute angle lobe is prepared, mud piece nature is good, mud falls easily, mud is not lifted by rotation of a wheel, either, and the anxiety of an unprepared doormat is canceled.

[0015] With the total rubber wheel for paddy field transit of this invention according to claim 3, since the equatorial side edge section of a lug is connected with the rib prolonged in a tire hoop direction, effectiveness is in sideslip-proof nature and good rectilinear-propagation nature can be obtained especially in a front wheel.

[0016] Although it is necessary with the total rubber wheel for paddy field transit of this invention according to claim 4 to discharge this mud to the side since mud will enter between lugs if a lug breaks in into soil by rotation of a wheel Since the hoop direction width of face of the tread tread section of a lug is dwindled as it goes to a tire shaft-orientations outside, it becomes large as the slot surrounded between lugs goes out of shaft orientations from an equator side, consequently earth removal to the side is performed smoothly, mud cannot be easily got blocked in a slot, and traction nature improves.

[0017] With the total rubber wheel for paddy field transit of this invention according to claim 5 In order

that whenever [ to the field which contains the tire axial center of the side-attachment-wall inclined plane of a lug in the hoop direction cross section of a lug / tilt-angle ] may gradually decrease as it goes to a tire shaft-orientations outside, It becomes large as the size in the groove bottom section between lugs goes to a tire shaft-orientations outside from the equator, consequently earth removal is performed smoothly, mud cannot be easily got blocked in a slot, and traction nature improves.

[0018]

[Example] One example of the total rubber wheel for paddy field transit of this invention is explained according to drawing 1 - drawing 7 .

[0019] As shown in drawing 4 thru/or drawing 7 , the boss 12 for attachment is arranged in the axial center section of the total rubber wheel 10 for paddy field transit. This boss 12 for attachment is made into the shape of a tube, and axle 14A of a rice planting machine 14 is equipped with him. This axle 14A is formed in four square axes ( drawing 4 ) or a cylindrical shaft ( drawing 5 ), and the fitting hole 16 of the boss 12 for attachment is attached outside axle 14A. When axle 14A is a cylindrical shaft, as shown in drawing 5 , he inserts key 16A, and is trying to tell rotation of axle 14A to a wheel.

[0020] Moreover, as shown in drawing 4 , the attaching hole 17 where the screw was turned off is established in the boss for attachment, a screw etc. is screwed in and (not shown) fixed to this attaching hole 17 with a wheel wearing posture, and the motion to the shaft orientations of a wheel is stopped. To the equator 31 of a wheel, the boss 12 for attachment projects a little on the outside of a rice planting machine 14, and is joined, and the through tube corresponding to the above-mentioned through tube 14 prepared in the point of an axle is prepared in the lateral part of this boss's rice planting machine. Thus, a wheel is faced equipping an axle and has directivity.

[0021] Three spoke 18A is joined to the periphery section of the boss 12 for attachment of the total rubber wheel 10 for paddy field transit. This three spoke 18A is prolonged on the radial outside, and forms the disk section 18 of a wheel. The radial lateral part of spoke 18A forms junction, now the attachment section [ in / it gets down and / the wheel of a tire ] 21 in the annular attachment member 20, and a tire is combined with this attachment section 21 in one.

[0022] Thus, the tire section 26 is combined with the wheel in one through the tire attachment section 21. In addition, let the tire section 26 be the total rubber tire. Moreover, that into which the above-mentioned attachment member 20 and spoke 18A processed metal pipes, such as iron and aluminum, is used.

[0023] Moreover, the accessory plate 15 is arranged in the radial inside section of the disk section 18. It is joined to spoke 18A by welding, and this accessory plate 15 has reinforced the disk 18.

[0024] As shown in drawing 1 , in tread tread section 26A of the tire section 26, a lug 34 is perpendicularly prolonged from the equatorial 31 neighborhood to the direction outside of an axis arm to the equator 31, and is arranged in the right-and-left each-other difference at hoop direction regular intervals. Moreover, the equator 31 top is connected with the rib 36 prolonged at a wheel hoop direction. at toe 34A by the side of the equator of a lug 34, and the part surrounded by the adjacent lug 34 and lug 34 of the same side serves as a slot 38 to the equator 31. in addition -- even if there is no rib 36 on the equator -- good -- the right and left from the equator -- it inclines toward either a little and you may make it make it arrange

[0025] As shown in drawing 2 and drawing 3 , as for the lug 34, the cross-section configuration cut in the field parallel to the equator 31 serves as [ the side-attachment-wall inclined plane 35 of bilateral symmetry ] Yamagata which carried out the concave bend to the center line of a lug in every cross section on the direction of an axis arm. in addition, the wheel hoop direction width of face L of top 34B of a lug 34 -- a rib 36 and abbreviation -- it considers as the same constant width.

[0026] Moreover, it is  $\alpha 1$  and  $\alpha 2$  whenever [ to the field H which includes the axis-arm alignment of top side edge section 34C of the side-attachment-wall inclined plane 35 of a lug 34 in the hoop direction cross section of a lug 34 / tilt-angle ]. It is gradually decreasing by having carried out toward the direction outside of an axis arm ( $\alpha 1 < \alpha 2$ ).

[0027] With the total rubber wheel 10 for paddy field transit of this example, the lug pattern of tread tread section 26A of the tire section 26 is point symmetry to the central point P of the distance between

the right-and-left lugs on the equator 31 (refer to drawing 1 ), and as the tire hoop direction cross section of a lug 34 is shown in drawing 2 and drawing 3 , it is a linear pair elephant in a hand of cut. For this reason, while plant-and-equipment investment and the burden of the storage space of a wheel are mitigated since a wheel on either side can be shared by turning over, and it is not necessary to prepare a wheel on either side separately, a possibility of making a mistake in and equipping paddy field transit with right and left also disappears.

[0028] In this example, mud plugging nature is improved by considering the disk section as a spoke type in this way. It has the lug of a large number which were perpendicularly prolonged from near the equator to the direction outside of an axis arm to the equator in the present of the tire section, and were arranged in the right-and-left each-other difference by hoop direction abbreviation regular intervals. A lug is written in the configuration which the cross-section configuration cut in parallel with the equator made abbreviation bilateral symmetry to the center line of a lug in every cross section on the direction of an axis arm, does not have a partition on either side and has the outstanding advantage of being good, by one kind.

[0029] the cross-section configuration cut in the field where the bore side of the total rubber tire 26 contains a tire axial center as shown in drawing 7 -- setting -- abbreviation -- it is formed of the acute angle lobe 25. The wheel of this example has the smooth doormat sides 25A and 25B in the bore side of the tire section, and the lobe 25 whose theta is 90 degrees whenever [ point-angle ] by this is formed. It excels in mud piece nature conjointly with the space section between spokes by this lobe, and mud can drop easily. 50 - 100 degrees of theta are desirable, and 60 - its 90 degrees are [ whenever / point-angle / of a lobe 25 ] still more desirable. At less than 50 degrees, the cross-section height prolonged in the bore side of the total rubber tire becomes high, the effectiveness of doormat nature becomes small, and if 100 degrees is exceeded, mud will become being easy to ride what has inadequate doormat nature.

[0030] With the total rubber wheel 10 for paddy field transit of this example, since equatorial side edge section 34A of a lug 34 is connected with the rib 36 prolonged in a wheel hoop direction, sideslip-proof nature can be raised and rectilinear-propagation nature especially good by the front wheel can be obtained.

[0031] With the total rubber wheel 10 for paddy field transit of this example, it sets in the hoop direction cross section of a lug 34. It is  $\alpha 1$  and  $\alpha 2$  whenever [ to the field H including the axis-arm alignment of tread side edge section 34C of the side-attachment-wall inclined plane 35 of a lug 34 / tilt-angle ]. Since it is gradually decreasing as it goes to a shaft-orientations outside from the equator ( $\alpha 1 < \alpha 2$ ), It becomes large as the size in the pars basilaris ossis occipitalis of a slot 38 goes to the direction outside of an equatorial 31 empty-vehicle wheel set, consequently earth removal is performed smoothly, mud cannot be easily got blocked in a slot, and traction nature improves.

[0032] Although the inclined plane (35) of a lug 34 considered as Yamagata which carried out the concave bend and made constant width wheel hoop direction width of face L of top 34A of a lug 34 in the above-mentioned example As it replaces with this and is shown in drawing 8 and drawing 9  $R > 9$ , it is good also considering the inclined plane 35 of a lug 34 as a straight line, and it is the wheel hoop direction width of face L1 of top 34B of a lug 34, and L2. It is good also as a configuration ( $L1 < L2$ ) dwindled as it went to the direction outside of an equator side empty vehicle wheel set.

[0033] In this case, although mud will enter between lugs 34 by rotation of a wheel if a lug 34 gets into soil, and it extrudes toward outside [ side / equator 31 ] The wheel hoop direction width of face L1 of top 34B of a lug 34, and L2 Since it is gradually decreasing as it goes to a shaft-orientations outside ( $L1 < L2$ ), It becomes large as it goes outside an equator 31 side, consequently from the side of the tread tread section 28, it becomes easy to carry out earth removal of the slot 38 surrounded by the adjacent lug 34 and lug 34 of the same side to the equator 31, it cannot carry out mud plugging easily, and traction nature improves.

[0034] In addition, the agreement (37) (refer to drawing 4 and drawing 5 ) shown in drawing 1 and drawing 6 is the (notch) level difference section prepared in the rib 36, and the periphery of a rib 36 has blocked it and can consider it as the assistance at the time of foreign matter riding \*\*\*\*.

[0035] [Example of a trial] In order to check the effectiveness of this invention, the total rubber wheel

for paddy field transit of this invention article (inventions 1 and 2), and the conventional pneumatic tire wheel for paddy field transit (conventional article 1) and the total rubber wheel for paddy field transit with the disc-like disk section (comparison article 1) are manufactured by use of Table 1, a doormat trial is performed to each, and the result is shown in Table 1.

[0036] in addition, the paddy field where the doormat trial passed after tilling before transplantation on the 5th -- carrying out -- the depth to a plowsole -- 150mm - 200mm -- it is -- soil texture -- a little -- a part for viscosity -- many -- \*\*\*\*\* -- being easy -- it carried out in the condition.

[0037]

[Table 1]

	従来品 1	比較品 1	発明品 1	発明品 2
タイヤ	空気入り	総ゴム	総ゴム	総ゴム
ディスク部	3 本スポーク	円盤	3 本スポーク	3 本スポーク
外径 (mm)	600	600	600	600
タイヤ幅 (mm)	60	60	60	60
ラグパターン	方向性有り	方向性有り	方向性無し	方向性無し
ラグ断面	非対称	非対称	対称	対称
ラグ幅	一定	一定	一定 (図 1)	外細い (図 8)
ラグ角度	一定	一定	外小 (図 2、3)	一定 (図 9)
必要タイヤ種	1 種	2 種	1 種	1 種
泥落とし性	やや良くない	良くない	良い	良い

[0038] The total rubber wheel for paddy field transit of the result of Table 1 to this invention article of a need tire kind (1 an invention, 2) is good at one kind, and doormat nature is better than a pneumatic tire, and it is clear to excel a disc-like disk.

[0039] Since the total rubber wheel for paddy field transit according to claim 1 has the hoop direction cross section of the lug of the tread tread section symmetrical with order to a hand of cut, Since a wheel on either side can be shared by turning over, and does not have a partition on either side, and it excels in the economical efficiency in which one kind is sufficient, and the disk section is a spoke type and mud cannot adhere to the total rubber tire attachment section easily due to the space between spokes, It has the effectiveness of raising doormat nature and raising traction nature.

[0040] the total rubber wheel for paddy field transit of this invention according to claim 2 -- the total rubber wheel for paddy field transit according to claim 1 -- setting -- the bore side of the tire section -- abbreviation -- since it consists of the acute angle tip sections, it has the effectiveness of being excellent in mud piece nature conjointly with the space section between spokes, and raising doormat nature.

[0041] Since the total rubber wheel for paddy field transit of this invention according to claim 3 considered as the configuration which leads to the rib with which the equatorial side edge section of a lug is prolonged in a tire hoop direction in the total rubber wheel for paddy field transit according to claim 1, in addition to the above-mentioned effectiveness, it cannot -proof sideslip easily and has the outstanding effectiveness that good rectilinear-propagation nature is obtained.

[0042] In the total paddy field transit this rubber wheel according to claim 1, although the total rubber wheel for paddy field transit of this invention according to claim 4 needs to discharge this mud since mud will enter between lugs if a lug gets into soil by rotation of a wheel Since hoop direction width of face of the tread tread section of a lug is made into gradual decrease \*\*\*\*\* as it goes to a tire shaft-orientations outside It becomes large as the slot surrounded between lugs goes out of shaft orientations from an equator side, consequently earth removal is performed smoothly, mud cannot be easily got blocked between lugs, and it has the effectiveness that traction nature improves.

[0043] With the total rubber wheel for paddy field transit of this invention according to claim 5 Since it is considering as the configuration dwindled as whenever [ to the field which contains the tire axial

center of the side-attachment-wall inclined plane of a lug in the hoop direction cross section of a lug / tilt-angle ] goes to a tire shaft-orientations outside in the total rubber wheel for paddy field transit according to claim 1 It becomes large as the size in the groove bottom section between lugs goes to a tire shaft-orientations outside from the equator, consequently earth removal is performed smoothly, soil cannot be easily got blocked in a slot, and it has the effectiveness that traction nature improves.

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[Translation done.]



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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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CLAIMS

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[Claim(s)]

[Claim 1] The boss for attachment to an axle, and two or more spokes which are joined by this boss for attachment and prolonged on the radial outside, It is the total rubber wheel for paddy field transit which has the tire attachment section prepared in the radial outside of this spoke, and comes to combine the total rubber tire with said attachment section in one. It is the total rubber wheel for paddy field transit to which it has the lug of a large number arranged in the hoop direction which extends in shaft orientations at the tread tread section of said tire by abbreviation regular intervals, and is characterized by the cross-section configuration cut in the field where said lug is parallel to the equator being abbreviation bilateral symmetry to the center line of a lug in every cross section on tire shaft orientations.

[Claim 2] the cross-section configuration cut in the field where said total rubber tire contains a tire axial center in the bore side -- setting -- a point -- abbreviation -- the total rubber wheel for paddy field transit according to claim 1 characterized by preparing the acute angle lobe.

[Claim 3] The total rubber wheel for paddy field transit according to claim 1 characterized by connecting the toe by the side of the equator of said lug with the rib prolonged in a tire hoop direction.

[Claim 4] The total rubber wheel for paddy field transit according to claim 1 characterized by gradually decreasing as the hoop direction width of face of said lug goes to a tire shaft-orientations outside.

[Claim 5] The total rubber wheel for paddy field transit according to claim 1 characterized by gradually decreasing as whenever [ to the field which contains the tire axial center of the side-attachment-wall inclined plane of a lug in the hoop direction cross section of said lug / tilt-angle ] goes to a tire shaft-orientations outside.

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[Translation done.]